Space Weather Forecast

Issued on Thursday, 20 April 2023 at 12:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor Geomagnetic Storms likely due to CME (Coronal Mass Ejection) activity, with a lower risk of Moderate or Strong Storms on 20 and 21 April. Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with occasional Common-class flares observed. There are currently five active regions on the visible disc. A region in the northwest is the largest region on the disc. This has shown some minor growth of intermediate spots in recent hours. The remaining groups are small and simple, and appear to be either stable or in slow decay.
No Earth-directed Coronal Mass Ejections (CMEs) have been observed in available imagery during the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind showed ongoing weak CME effects. Wind speeds have been at slightly elevated levels throughout much of the period, between 400-490km/s, and continue to show a declining trend towards background levels. Total magnetic field strength was at weak to moderate levels, with the north-south component varying moderately. Geomagnetic activity was Quiet to Active (Kp 1-4).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to generally be Low, with a chance of isolated Moderate activity, mainly due to the larger region in the northwest.

Solar Wind / Geomagnetic Activity: A CME may arrive at Earth on Days 1 or 2 (20 or 21 Apr), but confidence is low in the timing and impact of this feature. Otherwise, a coronal hole high speed stream may give elevated wind speeds on Days 3 or 4 (22 or 23 Apr).

Geomagnetic activity is forecast to be Quiet to Unsettled at first. Activity is likely to reach G1/Minor Storm levels (Kp5) on 20 or 21 Apr due to the anticipated CME arrival, with a lower risk of G2/Moderate (Kp6) or G3/Strong Storm (Kp7) conditions. Effects will slowly decline through the following days. This is likely to give visible aurora over Scotland, with a low chance of aurora further south across Northern Ireland, Wales and northern/central England.

Energetic Particles / Solar Radiation: Solar radiation is currently at background levels, with just a slight chance of any increase reaching the S1/Minor Storm level or greater. This is mainly due to the risk of flaring from the larger region in the northwest of the disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	60	30	10
Strong	G3	No	20	20	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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